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families of plants named in the literature. This is in addition to the general index for the volume as a whole.—R. B. WYLIE.

Chemistry of vegetable cell

A valuable service has been rendered to students of plant physiology by GRAFE,[2] who has prepared a textbook dealing with the biophysics and biochemistry of the processes of cell life in plants. The work was ready for publication when the war broke out, and has been delayed almost eight years by the conditions in Europe. This does not mean that the text is already old, for the delay has permitted a revision since the war, and much new material has been incorporated, particularly that which has been the result of discoveries in the laboratories of Europe. Any failure to note foreign results is excused by GRAFE on the grounds of the great difficulty experienced in keeping in touch with the scientific production of other nations.

The subject is presented under five main headings: the physicochemical laws of cell phenomena; light and heat as energy factors; the cell wall; the protoplasm; and dynamic chemistry. The first two sections occupy about a fourth of the text, and survey the problems of diffusion and osmosis, colloidal state, imbibition, adsorption, electrolytic dissociation, energy transformations, and catalysis. The third section is the briefest one, and deals with the structure, composition, and chemical transformations and modifications which occur in the walls of cells during development and maturation.

The section on protoplasm considers its colloidal structure, chemical constitution, the enzymes, toxins, precipitins, and pigments of the cell, particularly the chlorophyll and anthocyanin pigments. The final section is the longest and most important one, and considers the chemical transformations of cell activity. The author reverses the usual order of presentation by considering the utilization of energy and the respiratory processes first, then a brief consideration of stimulus and response, closing with the constructive energy-storing processes.

The book is intended as a general text for students, and the author has written in a style that is commendable for its clarity and directness. The literature list at the end of the volume occupies twenty double column pages, and the total number of references is nearly a thousand. Some of these references are not considered in the text of the volume, but are included for those who desire to orient themselves with reference to the literature on cell chemistry.—CHAS. A. SHULL.

Poisonous plants

A textbook dealing with the poisonous plants and weed seeds of Canada and the Northern United States has been prepared by THOMSON and SIFTON.[3]

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[2] GRAFE, VICTOR, Chemie der Pflanzenzelle. 8vo. pp. viii+420. *figs. 32.* Berlin: Borntraeger. 1922.

[3] THOMSON, R. B., and SIFTON, H. B., A guide to the poisonous plants and weed seeds of Canada and the northern United States. 8vo. pp. 169. *figs. 40.* University of Toronto Press. 1922.

It is intended to meet the needs of the veterinarian, the farmer, the stockman, and to a more limited extent the physician and the general public. The high standing of the authors and the fact that they are botanists insure accuracy so far as the plants are concerned.

The book is divided into four sections, the first three dealing with the plants mainly responsible for fatalities among animals, grouped on the basis of their occurrence in the animal's feed, whether found in hay (section 1), in pasture (section 2), or in concentrated feed stuffs (section 3). The fourth section deals with the plants which, although poisonous, seldom cause the death of animals. The larger number of poisonous plants, including those mainly responsible for poisoning in man, belong here. The forty illustrations are original and will enable the amateur to identify the plant responsible in an ordinary case of poisoning. There is a "symptoms" key, not claiming to be precise, but which will facilitate diagnoses by suggesting the plants which should be looked for when certain symptoms are observed and plant poisoning is suspected.

The authors emphasize the need for research on poisonous plants, both along the lines of chemical analysis and feeding experiments. The book is interesting and well written, and many of the observations, which could have been made only by experienced botanists, indicate the propriety of issuing such a book from a botanical department.—C. J. CHAMBERLAIN.

Constitution of vascular plants

CHAUVEAUD,[4] in a small volume, has presented his views as to the constitution of vascular plants, based upon an investigation of ontogeny. He calls attention to the disagreement between current theories and the facts he has observed in his investigations. His conclusion is that the body of vascular plants is built up by the successive appearance of fundamental units, or "phyllorhizes." As one passes from Pteridophytes to Spermatophytes, the disappearance of the root element ("rhize") is more and more frequent, and becomes the rule in Dicotyledons, where a rhize appears in connection with the first two phyllorhizes, but appears in connection with later phyllorhizes only in exceptional cases, as an adventitious root. In consequence of being thus reduced to a single member, the root has acquired the power of enlarging indefinitely and of persisting as long as the stem itself.

It is shown, also, that in the development of the apparatus of conduction there is a complete parallelism between internal and external morphology, since the vascular apparatus of the plant is built up by the repeated formation of elementary systems, each one corresponding to one of the phyllorhizes. Each bud is the beginning of a new phyllorhize to be added to the phyllorhize complex. In short, plants with roots are formed from elementary plantules or phyllorhizes, and the constitution of these is the unit of morphology.—J. M. C.

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[4] CHAUVEAUD, GUSTAVE, La constitution des plantes vasculaires révélée par leur ontogénie. 8vo. pp. 155. *figs. 54.* Paris: Payot. 1921. 10 fr.